Dispenser for pasty to flowable substances

The invention relates to a dispenser for pasty to flowable substances, the filling volume of which is held by a dimensionally stable container, at least half of which comprises a bag which, when emptied from the mouthpiece, collapses into one container half.

A dispenser of this type is known from EP 0 505 611 A2. The delivery of the pasty substance takes place by means of positive emptying pressure. It is produced by means of a dimensionally stable, squeezable container. The pressure build-up is obtained under valve control, acting from the bottom of the dispenser. Such a device is located in the head of the dispenser. The bag enclosed by the container comprises in part a bottom half which can be made to collapse and the other half of which is stiffened from the inside by a hard part.

US Patent 2,471,852 provides the proposal of producing the positive emptying pressure by means of a compression spring mounted at the bottom of the dimensionally stable container. The collapsing bag provided over it in that case comprises part of a cartridge, the upper container half of which is formed as a dome-shaped hard part, in the zenith of which there is an outlet valve, which is actuated by means of a dispenser mechanism similar to a pushbutton. By this means, the delivery path of the mouthpiece is opened or released. The spring has over it a cup-shaped body, which is shaped to follow the tapering collapsing contour.

It is an object of the invention to form a dispenser of the generic type that is structurally simple and functionally reliable.

This object is achieved in first instance and substantially by a dispenser with the features of claim

1, it being provided that the bag collapses on account of a negative emptying pressure produced by a mouthpiece pump, that is in the direction of a free space of corresponding size facing the pump.

As a consequence of such a configuration, a dispenser of the generic type of a simpler, functionally more advantageous design is achieved: there is no longer any need for the deforming squeezing actuation of the container, which if overdone or underdone could lead to malfunctions and, moreover, also takes quite some getting use to. Rather, the dispenser head actuation of the accustomed form of handling is used. The replenishing of the apportioned portion dispensed takes place by suction via the filling level column of the pasty to flowable substance. The bag follows on automatically in the dispensing direction. It is, as it were, drawn along as an air-impermeable skin, to be precise from the position near the bottom into the region of the dispenser head, where it makes it possible for the residue left in the dispenser to be satisfactorily emptied, and to do so without a special dispensing aid, as provided in the prior art in the form of the spring described. The negative emptying pressure produced in the region of the mouthpiece pump is entirely adequate for the supplying collapse.

The respective subject matter of the further claims is explained below with reference to the subject matter of claim 1, but may also be of importance in their independent formulation. For instance, it proves to be structurally advantageous that an inwardly protruding edge of the bag in the region of the, as it were, equatorial connecting join of two container shell halves is held in a flange-like manner, one half carrying the emptying mouthpiece pump in the apex region. The edge of the bag is held as though it were between two clamping jaws. The longitudinally central securing also has the effect that there is no stress on

the bag; it is acted on virtually equally in both directions. The flange-like holding of the edge of the bag can be achieved by screw connection if the dispenser and the container of are of a rotationally symmetrical construction. Otherwise, in the case of unround cross sections, a thermal bonding takes place in this region.

Even adhesive bonding is conceivable. Disposing the emptying mouthpiece pump in the apex region of one half leads to a welcome polydirectionality of wall portions and consequently to a stabilization of the entire container, the half lying below the equator stabilizing the relevant region; the dispenser as a whole lies well in the hand for operating purposes. With sufficiently extensible material, the bag can also be reduced to a virtually planar membrane. The filling pressure then turns the membrane out within the container to form a bag, which in the way described collapses in the opposite sense, that is in the direction of the emptying mouthpiece pump, as emptying progresses. Even the restoring force of the material can be used to help achieve this. Whatever the case, it proves to be advantageous for both versions that a grid is disposed in front of the passage region between container shell half and emptying mouthpiece pump, to support the collapsed bag. This prevents the delivery access path from being clogged with pasty substance. Serving the same purpose, that of ensuring that flow supply paths are kept free of clogging pasty substance, is the measure that the shell half equipped with the emptying mouthpiece pump has on its inner surface supporting ribs for the bag, preferably reaching as far as the passage region. Such a system of struts, similar to buildings, can be provided already in the injection-molding process. Path-blocking arrangements such as loops are avoided. It is also advantageous that the bag has an easily stabilized base area. This part, which is subjected to increased mechanical loading, is

consequently ideally suited for using the dispenser when re-filling as a disposable article. A further measure for dispensing the substances without delivery coming to a halt is that the inlet opening, adjoining the passage region, of the emptying mouthpiece pump is formed as a web-interrupted annular opening, running concentrically and coaxially in relation to the bag. The substance present is sucked over a wide front to replenish the supply. No partial pockets can form in the bag. Instead of a web-interrupted annular opening, an annular opening may also be formed by a ring of holes. In one case as in the other, the further measure that the annular opening is disposed in the base of a collecting funnel diverging counter to the direction of delivery of the substances proves to be advantageous. Said collecting funnel acts as an aligned feeding collector. Finally, it is advantageous in terms of flow that the diameter of the annular opening substantially corresponds to the diameter of the passage region or grid.

The subject matter of the invention is explained in more detail below with reference to an exemplary embodiment illustrated by drawings, in which:

figure 1 shows the dispenser realised as a standing unit, in side view, closed by a protective cap, slightly enlarged,

figure 2 shows the plan view of this,

figure 3 shows the dispenser in an exploded representation,

figure 4 shows an inner view of the shell half of the container carrying the emptying mouthpiece pump, showing supporting ribs for the bag,

figure 5 shows a vertical section through the container of the dispenser, with flanges still unconnected,

figure 6 shows a enlargement VI from figure 5,

figure 7 shows a cross-section in the region of a supporting rib and

figure 8 shows a vertical section through the emptying mouthpiece pump, greatly enlarged.

The dispenser Sp represented is realised as a standing unit. It serves for dispensing pasty to flowable substances M, the filling volume of which is held by a dimensionally stable container 1.

The container 1 is of an elongate form, flat and of unround cross-section, preferably elliptical (see figure 2).

The container 1 is divided in half with regard to its longitudinal center axis x-x in terms of assembly.

It comprises an upper shell half 2 and a lower shell half 3. Their open ends, directed toward each other, butt together in a plane E-E lying perpendicular to the longitudinal center plane x-x. The shell halves 2, 3 are identical in terms of their cavity, apart from further molded formations still to be explained below.

The open ends, directed toward each other, are angled away outward at the periphery. In this case, the upper shell half 2 provides a flange 4 and the lower shell half 3 provides a flange 5 (cf. also figure 6).

The flange 4 of the upper shell half 2 is folded vertically in the direction of a standing surface 6, as seen in the longitudinal direction of the container 1.

The corresponding angle leg 7 engages over the outwardly directed end edge 8 of the flange 5 of the lower shell half 3.

The relevant edge contour consequently forms a channel 9 (cf. figure 3) for the snug fit of the flange 5 of the lower shell half 3.

The precision of this peripheral edge connection creates a good basis for the mounting of an internal element of the container 1, to be precise in the form of a bag 10. Said bag is foldable, preferably capable of turning inside out, and has for this purpose the required elasticity or also flexibility.

The bag 10 is made to match the inner lining both of the lower shell half 3 and of the upper shell half 2 that can be reached when it collapses. It comes to lie in close contact with the respective inside wall of the container shell halves 2, 3. Above, pasty substance M lies in between.

Facing the plane E-E, the bag 10 is held on the container side by means of an edge 11. The faces directed toward one another of the flanges 4 and 5 serve in this case as a connecting join similar to clamping jaws. The correspondingly outwardly projecting edge 11 of the bag 10 is in this case captured in the region of an, as it were, equatorial connecting join. Its elastic material serves in this case at the same time as a seal. The connecting join has the reference numeral 12. It may have parallel walls, as clearly shown by figure 6, or else thicken wedgingly continuously toward the outer edge, so that undercut areas are created which, in addition to the mere nonpositive connecting engagement, also permit a positive engagement as a reinforced capturing means. The entries to the connecting join have a convex

transverse rounding. This avoids a cutting action at the "collapse hinge".

After positioning of the bag 10, the further bending of the angle leg 7 takes place, ending in a final engagement under the flange 5 of the lower shell half 3.

The bending of the angle leg 7 may take place thermally. On the other hand, an adhesive connection, a latching connection or even a screw connection is also conceivable if the shell halves 2, 3 are rotationally symmetrical, at least in the region of the join.

With respect to their sides remote from the open ends, directed toward one another, the shell halves 2, 3 go over into narrowed cross-sectional zones. The upper tapering zone in this case ends in a passage region 13 of the container 1 for the delivery of the pasty substance M. Said passage region is circular and of relatively large diameter, using virtually the entire flattening width of the container 1.

The end of the lower shell half 3 directed toward the standing surface 6 likewise goes over into a narrowed cross-sectional zone. This tapering zone has a standing edge 14. Said standing edge is of such a vertical height that it leaves a clearance with respect to said standing surface 6 under the base 15 of the container 1 formed there. The base 15 has in the center an air-equalizing opening 16. Said opening compensates in terms of volume for the region underneath the bag 10 as the latter moves upward.

In the passage region 13, the upper shell half 2 continues into an upwardly directed connection piece 17. This is an integrally formed portion. The connection piece 17 receives an annular collar 18

adapted to it by being reduced in diameter. Both formations are basically cylindrical.

The relevant head region of the dispenser Sp serves for receiving a manually actuable emptying mouthpiece pump P.

The emptying mouthpiece pump P actually seated in the apex region of the upper shell half 2 forms with its upper structure an actuating button 19 oriented vertically in terms of movement. Away from its recessed actuating surface, there is a laterally directed, upwardly sloping mouthpiece 20. Said mouthpiece is of a tubular form, at least in the end region, and is consequently suitable for the delivery of an amount of pasty or flowable substance M formed into a strand.

A negative pressure is exerted by means of the mouthpiece pump P, obtaining the effect of powerful, complete emptying of the bag 10, which initially hangs down then increasingly collapses in the dispensing direction, to be precise perceptibly in the direction of a clearance facing the mouthpiece pump P of the upper shell half 2 of a size corresponding to the bag 10. The direction of delivery is identified by arrow y. It coincides with the longitudinal center axis x-x and goes over into a slightly rising lateral direction within the actuating button 19. The actuating button 19, carrying the mouthpiece 20, can be turned, about said longitudinal centre axis x-x. This permits individually operatingly-convenient dispensing, whether over the longer axis of the elliptical outline of the container 1 or over the shorter axis or over steplessly achievable intermediate regions.

As already indicated, the delivery does not leave any residue, since a grid 21 is disposed in front of the passage region 13 of the container 1, between the

inside wall of the upper container shell half 2 and the emptying mouthpiece pump P. Said grid fills the passage region 13 and is convexly curved slightly into the region of the filling volume, counter to the direction of delivery arrow y. It is stiffened in this way. The grid 21 may be a separate component. However, it is also possible for this basket-like formation already to be molded onto the upper shell half 2. As can be seen, the assembly comprises an outer ring 22 and an inner ring 23 joined by radial webs 24 (reference is made to figure 4). There are six radial webs 24, to be precise spaced at equal angles from one another.

A further means for dispensing the pasty substance M with virtually no residue is that the shell half 2 equipped with the emptying mouthpiece pump P on the inside is provided with supporting ribs 25 for the bag 10. Said bag cannot then get in the way, even partially. Rather, the flow supply paths W are kept free by the exposed system of struts of such supporting ribs 25 (compare figure 7). The bag 10 or its wall can move in an orderly fashion toward the passage region 13 in the direction of delivery arrow y. With the grid 21 formed separately, the outer ring 22 rests on heads 25' of the supporting ribs 25 protruding into the passage region 13. Said outer ring is mounted in a clamping manner on them.

Altogether, eight supporting ribs 25 distributed at equal angles are provided. They can already be moulded-in. The rib height increases continuously in the direction of the passage region 13 and tapers in the opposite direction on the inner face of the shell surface 2.

As can be seen from figure 3, the base area 26 of the bag 10 is formed with a thicker wall than the wall of the bag 10 adjoining in the manner of a cup. The

thickness is chosen such that the overall collapsability is not impaired, that is to say that the collapsing behavior is retained. Said thickening acts like a slightly stiffened follow-up base. The thickening may extend over the entire base area 26 or, however, as represented, be formed merely as an annular path.

The head of the dispenser Sp has a protective cap 27 over it. This at the same time avoids unwanted discharge of the content, for example when the container 1 is carried along with other utensils in a bag or the like.

The relative position of the protective cap 27 is defined, for example by use of the stepped transition between the connection piece 17 and the annular collar 18, forming a shoulder 28.

The cap-shaped body may be frictionally mounted; however, a screw connection may also be used, as preferred here (compare figure 8). The annular collar 18 received in the connecting piece 17 is part of an insert 29 received in the dispenser head. Said annular collar is terminated on the substance side by a base 30.

Extending from the base 30 is part of the cylinder 31 forming the aforementioned emptying mouthpiece pump P.

Running in the cylinder 31 is a piston 32, which can be displaced against spring loading by the actuating button 19. Said piston forms the upper limitation of a pump chamber 33, the lower termination of which is provided by the base 30.

In the base 30 there is an inlet valve V1. It is a non-return valve, which controls in terms of flow an

annular opening 34 incorporated in the base 30 and consists of elastomeric material.

Seated on the piston head 35 is an outlet valve V2. This is also an elastomeric component acting in the manner of a non-return valve.

The outlet valve V2 keeps passage openings 36 closed.

Behind the outlet valve V2 there is an intermediate chamber 37 with flow connection to a central channel 38 of the actuating button 19 connected to the piston 32.

The central channel 38 itself is then in connection with the mouthpiece 20.

For forming the intermediate chamber 37 and also for receiving the central channel 38, the shaft 39 of the piston 32 attached to the rear of the piston head 35 is of a hollow form. As can be seen from the drawing, the functional parts are accommodated in it appropriately for operation.

A connecting part 40 contributes to this. So too does the cup-shaped form. The cup opening points in the direction of the container 1. Its top is firmly connected to the actuating button 19.

On the outside, the cup-shaped connecting part 40 is provided with an annular stop projection 41. Said stop projection interacts with an axial channel 42, providing counter stops, on the inner side of the annular collar 18. The annular width determines the excursion and establishes the portion-forming clearance of the pump chamber 33.

The cup-shaped connecting part 40, like the annular wall of the cylinder 31 open in the opposite direction, contributes to the creation of a spring chamber 43.

Said spring chamber receives a compression spring 44. The latter loads the actuating button 19 in the direction of the basic position, as revealed by figure 8. For this purpose, the spring action at the upper end is directed against the top of the cup-shaped connecting part 40 and the spring action at the end facing the supply of substance is directed against the base 30, which consequently forms the fixed abutment. Special supporting elements such as webs, beads etc. are used. The compression spring 44 has a slight bias.

The transfer of the pasty to flowable substance M into the apportioning region of the dispenser Sp, here initially the pump chamber 33, takes place over a relatively broad base and not through a centrally located access path. This is actually embodied by the inlet opening of the emptying mouthpiece pump P, adjoining the grid-protected passage region 13, being formed as an annular opening 34, running concentrically coaxially with respect to the bag 10. The annular opening 34 formed in the base 30 is interspersed, between the central region of the base and the base region concentrically adjoining radially beyond the annular opening, by webs 45. Such webs 45, disposed in the manner of spokes, preferably extend such that they are spaced at equal angles from one another. A likewise advantageous variant could consist in forming the annular opening 34 by holes of a ring of holes. Such holes are likewise uniformly spaced apart in the circumferential direction.

The web-interrupted system explained and also the ring of holes system can optionally also be used with respect to the passage opening 36 in the region of the outlet valve V2.

Both the annular opening 34 according to the described basic configuration and the passage opening 36 continue in the direction of delivery arrow y into funnel-shaped

widened portions in the manner of countersunk holes for screws. This assists the raising of the valves V1, V2 to open them during the discharging pumping process.

This achieves the overall effect that the delimiting region of the substance M, "sucked" as it were by the negative pressure of the pump P in the direction of delivery arrow y, is fed over a broad front to the transfer region, which by simple means rules out tilting of the bag 10, possibly forming a pocket, causing a blockage, in particular in the end phase of the dispensing.

This advantageous effect is further enhanced by the annular opening having a catching funnel 46 on the side facing the substance M. Said catching funnel is already moulded into the base 30 and has a wall diverging in a rotationally symmetrical manner counter to the dispensing direction arrow y. The diameter of the annular opening 34 substantially corresponds to the diameter of the passage region 13 or of the grid 21.

It remains to be stated that the emptying mouthpiece pump P, completely pre-assembled, can be positioned in relation to the neck, that is the connecting piece 17, of the container 1 by way of the screw connection. The thread is designated by 47. At the height of the inlet valve V1 there is a screw limitation 48. Directed inward into the housing, said screw limitation continues into a shoulder wall, which in the way described above carries the grid 21. Between the grid 21 and the base 30 there remains a dispensing antechamber, which cannot be clogged by the bag wall.

The delivery takes place as follows: downward movement of the actuating button 19 causes the volume of the pump chamber 33 to be reduced. Substance M located in it cannot escape in the direction of the supply on account of the closing action of the inlet valve V1.

Rather, the enclosed substance, passing the passage opening 36, is delivered via the intermediate chamber 37 to the central channel 38, to emerge from there via mouthpiece 20. This path is released by the opening action of the outlet valve V2. If the actuating button 19 is let go after delivery, a return displacement of the piston 32 takes place in the direction of the basic position represented. This leads to a negative pressure in the pump chamber 33. Correspondingly, substance M is replenished from the supply. The inlet valve V1 opens. Extraneous air cannot enter as a result of the closing action of the outlet valve V2. The return displacement takes place because of the force of the compression spring 44.

All disclosed features are (in themselves) pertinent to the invention. The disclosure content of the associated/attached priority documents (copy of the prior patent application) is also hereby incorporated in full in the disclosure of the patent application, including for the purpose of incorporating features of these documents in claims of the present application.